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EXAMINER

LE, VU

ART UNIT	PAPER NUMBER
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2613

DATE MAILED: 12/03/2004

9

Please find below and/or attached an Office communication concerning this application or proceeding.

DT

Office Action Summary

Application No.

09/827,997

Applicant(s)

COOPER, DAVID H.

Examiner

Vu Le

Art Unit

2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-70 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 19-24, 26-41, 44-48, 50-60 and 62-70 is/are rejected.
- 7) ☒ Claim(s) 17, 18, 25, 42, 43, 49 and 61 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4.5</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

1. Prosecution on the merits of this application is reopened on claims 1-70 considered unpatentable for the reasons indicated below:

Upon further review of the prior art of record, Examiner regrettably acknowledges that an error has been made and that prior art rejections in view of the following US patents should have been made of record. Examiner would like to extend a sincere apology for any inconveniences and time delay in prosecution. The US patents applicable to the subsequent prior art rejections are as follow:

5,527,261 (Monroe et al)
6,753,901 (Takahashi et al)
5,896,166 (D'Alfonso et al)
6,190,309 (Ooshima et al)
5,124,797 (Williams et al)
5,702,249 (Cooper)

If applicant wishes to inquire or has questions with regards to the reopen prosecution, applicant may contact the examiner at the phone number listed at the conclusion of this Office Action.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-2, 5-8, 10-12, 14-16, 20-22, 29-31, 33-38, 40-41, 45-47, 56-59, 64-66 are rejected under 35 U.S.C. 102(b) as being anticipated by Monroe et al, US 5,527,261.

Re claim 1, Monroe et al discloses a dental imaging system (fig. 1), comprising:
a handpiece (10) including a handle portion (12 & 14, col. 3, lines 24-27) and a distal end portion (18, col. 3, lines 27-32), said distal end portion having a view port (24, also fig. 2) for viewing intra- and extra-oral dental anatomy (col. 4, lines 16-49, col. 5, lines 28-44);

an optical system mounted in said distal end portion of said handpiece, said optical system being configured to acquire, orient and transmit an image of said dental anatomy appearing in said view port (fig. 2: 72-83, col. 4, lines 18-29);

a sensor assembly mounted in said distal end of said handpiece, said sensor assembly being configured to convert images received through said optical system into video digital signals (fig. 2: 68, col. 4, lines 16-18, col. 5, lines 8-14);

a camera control unit mounted in said handle portion of said handpiece, said camera control unit being configured to receive said video data signals from said sensor assembly and to generate video output signals of said image from said video data signals (col. 4, lines 10-15, col. 5, lines 10-27);

and an interface means (fig. 1: 32) connected to said camera control unit for providing power to said camera control unit and for receiving video output signals from said camera control unit for transmission (col. 3, lines 48-50) to a device for display (52) or further processing (col. 3, lines 32-67, col. 5, lines 14-27).

Art Unit: 2613

Re claim 2, the dental imaging system of claim 1 where said interface means (fig. 1:32) comprises a utility cable (28), said utility cable connecting said handpiece (10) to one of an interface unit and a docking station (fig. 1 shows cable 28 connecting handpiece 10 to interface unit 32, note: in applicant's specification, p.5, paragraph 0018, is either an interface unit or a docking station, implying one in the same. For that reason, the interface means 32 in Monroe et al is either an interface unit or a docking station, depending on how it is referenced), said utility cable (28) comprises a camera cable having first cable components to convey said power to said camera control unit from said one of an interface unit and a docking station and second cable components to convey said video output signals from said camera control unit to said one of an interface unit and a docking station (fig. 1, col. 3, lines 32-33, col. 6, lines 11-14, in these segments, Monroe et al discloses the utility cable 28 carries processed video signals that are being communicated to the interface unit 32. Although the utility cable 28 is not explicitly described to also include a power cable as claimed, it is inherent that power must also be provided from the interface unit 32 to the handpiece 10 in order for it to be operational. No where in Monroe et al that states explicitly or impliedly that the handpiece unit 10 operates on an independent or self-contained power source. Thus, power must also come from the interface unit 32 via cable 28 as well as the exchange of processed video signals from the handpiece 10 to the interface unit 32 as mentioned above).

Art Unit: 2613

Re claim 5, the dental imaging system of claim 2 wherein said utility cable further comprises a fiber optic light guide to transmit light from said one of an interface unit and a docking station to said handpiece. (See col. 4, lines 65-67).

Re claim 6, the dental imaging system of claim 2 wherein said camera cable comprises third cable components to convey control signals to said camera control unit from said one of an interface unit and a docking station. (See col. 5, lines 23-27, in this segment, it is evidenced that control signals are communicated between the interface unit. Thus, the utility cable 28 inherently must have cable components to convey control signals as claimed).

Re claim 7, the dental imaging system of claim 1 wherein said interface means comprises a battery to supply power to said camera control unit (fig. 3: 44, col. 3, lines 39-41, col. 5, lines 14-18).

Re claim 8, the dental imaging system of claim 1 wherein said interface means comprises a wireless transmission system to transmit said video output signals from said camera control unit to a remote receiver (figs. 1 & 3: 36, col. 3, lines 48-53).

Re claim 10, the dental imaging system of claim 1 further comprises an illumination source. (See fig. 2: 84).

Re claim 11, the dental imaging system of claim 10 wherein said illumination source comprises a lamp, a reflector and a lens. (See col. 4, lines 60-67).

Re claim 12, the dental imaging system of claim 11 wherein said handpiece further comprises a light guide to receive light from said lens and transmit said light to said distal end portion of said handpiece. (See col. 4, lines 60-67).

Re claim 14, the dental imaging system of claim 1 further comprising one of an interface unit and a docking station to receive said video output signals from said camera control unit. (figs. 1-2, col. 3, lines 32-33, col. 4, lines 8-14, in this segment, it is clear that processed video signals obtained from the handpiece 10 are output to the interface unit 32).

Re claim 15, the dental imaging system of claim 1 further comprising:

a connector to flexibly interconnect said camera control unit with said sensor assembly (fig. 2, col. 4, lines 9-18, in this segment, the circuit board 64 connecting the image sensor assembly 66,68 to the video control processing circuit board 62 is flexible);

and a connector to flexibly interconnect said interface means and said camera control unit circuit (fig. 1:28, in the figure, cable 28 is flexibly interconnecting the interface unit 32 and the handpiece 10, which housed the video control processing circuit board 62 of figure 2).

Re claim 16, the dental imaging system of claim 15 wherein:

said connector to flexibly interconnect said camera control unit with said sensor assembly comprises a flexible printed circuit (the claimed limitations have analyzed and rejected w/r to claim 15 above);

and said connector to flexibly interconnect said interface means and said camera control unit comprises a flexible printed circuit (the claimed limitations have analyzed and rejected w/r to claim 15 above; furthermore, in fig. 2, element 30,56,58,60 make up

the integral connector end of the connecting cable 28 wherein element 60 is a printed circuit).

Re claim 20, the dental imaging system of claim 1 wherein said camera control unit comprises one of a digital signal processor and an analog signal processor. (See col. 4, lines 10-14, col. 5, lines 9-14).

Re claim 21, the dental imaging system of claim 1 wherein said sensor assembly comprises one of a charge coupled device, a CMOS device and an active pixel sensor. (See col. 4, line 16).

Re claim 22, the dental imaging system of claim 1 wherein said sensor assembly is axially adjustable into a plurality of predetermined focus modes to focus on said dental anatomy. (See col. 4, lines 16-29, col. 5, lines 28-45).

Claim 29 recites "[A] camera handpiece for a dental imaging system, said camera handpiece comprising: a housing including a handle portion and a distal end portion, said distal end portion having a view port for viewing intra- and extra-oral dental anatomy; an optical system mounted in said distal end portion of said housing, said optical system being configured to acquire and transmit an image of said dental anatomy appearing in said view port; a sensor assembly mounted in said distal end of said housing, said sensor assembly being configured to convert images received through said optical system into video data signals; camera control unit mounted in said handle portion of said housing, said camera control unit being configured to receive said video data signals from said sensor assembly and to generate video output signals of said image from said received video data signals; and an interface means connected to

said camera control unit for providing power to said camera control unit and for receiving video output signals from said camera control unit for transmission to a device for display or further processing[.]” (The claimed limitations have been analyzed and rejected w/r to claim 1).

Re claim 30, the camera handpiece of claim 29 wherein said interface means further comprises means for conveying control signals to said camera control unit. (The claimed limitations have been analyzed and rejected w/r to claim 6).

Re claim 31, the camera handpiece of claim 30 wherein the interface means comprises a cable interface to connect a utility cable to said camera handpiece. (The claimed limitations have been analyzed and rejected w/r to claim 2).

Re claim 33, the camera handpiece of claim 29 wherein said interface means comprises a battery to supply power to said camera control unit. (The claimed limitations have been analyzed and rejected w/r to claim 7).

Re claim 34, the camera handpiece of claim 29 wherein said interface means comprises a wireless transmission system to transmit said video output signals from said camera control unit to a remote receiver. (The claimed limitations have been analyzed and rejected w/r to claim 8).

Re claim 35, the camera handpiece of claim 34 wherein said wireless transmission system comprises a transmitter and an antenna. (See Monroe et al, fig. 1, col. 3, lines 48-52).

Re claim 36, the camera handpiece of claim 29 further comprises an illumination source. (The claimed limitations have been analyzed and rejected w/r to claim 10).

Re claim 37, the camera handpiece of claim 36 wherein said illumination source comprises a lamp, a reflector and a lens. (The claimed limitations have been analyzed and rejected w/r to claim 11).

Re claim 38, the camera handpiece of claim 37 further comprises a light guide to receive light from said lens and transmit said light to said distal end portion of said handpiece. (The claimed limitations have been analyzed and rejected w/r to claim 12).

Re claim 40, the camera handpiece of claim 29 further comprising: a connector to flexibly interconnect said camera control unit with said sensor assembly; and a connector to flexibly interconnect said interface means and said camera control unit. (The claimed limitations have been analyzed and rejected w/r to claim 15).

Re claim 41, the camera handpiece of claim 40 wherein: said connector to flexibly interconnect said camera control unit with said sensor assembly comprises a flexible printed circuit; and said connector to flexibly interconnect said interface means and said camera control unit comprises a flexible printed circuit. (The claimed limitations have been analyzed and rejected w/r to claim 16).

Re claim 45, the camera handpiece of claim 29 wherein said sensor assembly comprises one of a charge coupled device, a CMOS device and an active pixel sensor. (The claimed limitations have been analyzed and rejected w/r to claim 21).

Re claim 46, the camera handpiece of claim 29 wherein said camera control unit comprises one of a digital signal processor and an analog signal processor. (The claimed limitations have been analyzed and rejected w/r to claim 20).

Re claim 47, the camera handpiece of claim 29 wherein said sensor assembly is axially adjustable into a plurality of predetermined focus modes to focus on said dental anatomy. (The claimed limitations have been analyzed and rejected w/r to claim 22).

Claim 56 recites "[A] dental imaging system, comprising: a handpiece including a handle portion and a distal end portion, said distal end portion having a view port for viewing intra- and extra-oral dental anatomy; an optical system mounted in said distal end portion of said handpiece, said optical system being configured to acquire, orient and transmit an image of said dental anatomy appearing in said view port; a sensor assembly mounted in said distal end of said handpiece, said sensor assembly being configured to convert images received through said optical system into video data signals; a camera control unit mounted in said handle portion of said handpiece, said camera control unit being configured to receive said video data signals from said sensor assembly and to generate video output signals of said image from said video data signals; and a docking station connected to said camera control unit, said docking station being configured to provide power and control signals to said camera control unit and to receive video output signals from said camera control unit for display or further processing[.]" (The claimed limitations have been analyzed and rejected w/r to claim 1).

Re claim 57, the dental imaging system of claim 56 further comprising a utility cable to connect said handpiece and said docking station, said utility cable comprises a camera cable having first cable components to convey said power and control signals to said camera control unit from said docking station and second cable components to convey said video output signals from said camera control unit to said docking station,

and said utility cable further comprising a fiber optic light guide to transmit light from said interface unit to said handpiece. (The claimed limitations have been analyzed and rejected w/r to claim 2).

Re claim 58, the dental imaging system of claim 57 further comprising: a flexible printed circuit to flexibly interconnect said camera control unit circuit with said sensor assembly, and a flexible printed circuit to flexibly interconnect said camera cable and said camera control unit circuit. (The claimed limitations have been analyzed and rejected w/r to claims 15-16).

Re claim 59, the dental imaging system of claim 56 wherein said sensor assembly is a charge coupled device. (The claimed limitations have been analyzed and rejected w/r to claim 21).

Claim 64 recites "[A] camera handpiece for a dental imaging system, said camera handpiece comprising: a housing including a handle portion and a distal end portion, said distal end portion having a view port for viewing intra- and extra-oral dental anatomy; an optical system mounted in said distal end portion of said housing, said optical system being configured to acquire and transmit an image of said dental anatomy appearing in said view port; a sensor assembly mounted in said distal end of said housing, said sensor assembly being configured to convert images received through said optical system into video data signals; a camera control unit mounted in said handle portion of said housing, said camera control unit being configured to receive said video data signals from said sensor assembly and to generate video output signals of said image from said received video data signals; and a cable interface to connect a

utility cable to said camera handpiece[.]” (The claimed limitations have been analyzed and rejected w/r to claim 1; also, fig. 1 of Monroe et al shows a cable interface 28).

Re claim 65, the camera handpiece of claim 64 further comprising:

a flexible printed circuit to flexibly interconnect said camera control unit circuit with said sensor assembly; and a flexible printed circuit to flexibly interconnect said cable interface and said camera control unit circuit. (The claimed limitations have been analyzed and rejected w/r to claims 15-16).

Re claim 66, the camera handpiece of claim 64 wherein said sensor assembly is a charge coupled device. (The claimed limitations have been analyzed and rejected w/r to claims 21).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3-4, 19, 44, 62, 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Monroe et al as applied to claims 1-2, 29, 56, 64 above and further in view of Takahashi et al, US 6,753,901.

Re claim 3, Monroe et al discloses substantially the dental imaging system of claims 1-2, but fails to further disclose “...wherein said second cable components comprise conductors to convey one of S-video signals, composite video signals and digital video signals[.]” Takahashi et al teaches that it is obvious to convey one of S-

Art Unit: 2613

video signals, composite video signals and digital video signals in an endoscope system (figs. 1-2, col. 4, line 66 – col. 5, line 9, col. 6, lines 5-41).

Therefore, taking the combined teaching of Monroe et al and Takahashi et al as a whole, it would have been obvious to modify Monroe in view of Takahashi to include video cable that's capable of conveying one of S-video signals, composite video signals and digital video signals as claimed, for the benefit of versatility and security when interfacing with external peripheral devices (Takahashi et al, col. 2, lines 4-26).

Re claim 4, the dental imaging system of claim 3 wherein said second cable components comprise conductors to convey S-video signals. (The limitations have been analyzed and rejected w/r to claim 3).

Re claim 19, the dental imaging system of claim 1 wherein said video output signals from said camera control unit comprise one of S-video signals, composite video signals and digital video signals. (The limitations have been analyzed and rejected w/r to claim 3).

Re claim 44, the camera handpiece of claim 29 wherein said video output signals from said camera control unit comprise one of S-video signals, composite video signals and digital video signals. (The limitations have been analyzed and rejected w/r to claim 3).

Re claim 62, the dental imaging system of claim 56 wherein said camera control unit comprises a digital signal processor and means for generating a video output signal in an S-video format. (The limitations have been analyzed and rejected w/r to claim 3).

Re claim 69, the camera handpiece of claim 64 wherein said camera control unit comprises a digital signal processor and means for generating a video output signal in an S-video format. (The limitations have been analyzed and rejected w/r to claim 3).

6. Claims 9, 32, 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Monroe et al as applied to claims 1, 29-31 above and further in view of D'Alfonso et al, US 5,896,166.

Re claim 9, Monroe et al disclose the dental imaging system of claim 1, but fails to disclose wherein said interface means are detachably connected to said handpiece as claimed. D'Alfonso et al makes it well known (fig. 1) the interface means 1 detachably connected to the hand-held endoscope (combination of 3,7,8, also col. 2, lines 57-67) as claimed.

Therefore, taking the combined teaching of Monroe et al and D'Alfonso et al as a whole, it would have been obvious to modify Monroe et al (fig. 1) to have the interface means 32 detachably connected to the handpiece 10 as claimed for the benefit of interchangeability among different imagers for different medical applications in order to achieve optimum video picture as suggested by D'Alfonso et al (see "Background").

Re claim 32, the camera handpiece of claim 31 wherein said cable interface is configured to provide a detachable connection between said utility cable and said camera handpiece. (The claimed limitations have been analyzed and rejected w/r to claim 9).

Re claim 54, Monroe et al discloses the camera handpiece of claim 29, but fails to further disclose said camera control unit comprises a non-volatile memory to store control instructions for said camera control unit as claimed.

D'Alfonso et al makes it well known a camera control unit (fig. 2) comprises a non-volatile memory (34, col. 3, line 12) to store control instructions for said camera control unit for the benefit of storing operating parameter information which may be read by the video camera system to provide optimum operating conditions (Summary of the Invention).

7. Claims 13, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Monroe et al as applied claims 1, 10, 29, 36 above and further in view of Ooshima et al, US 6,190,309.

Re claim 13, Monroe et al discloses the dental imaging system (figs. 1-2) wherein the illumination source is preferably but not limited to a miniature halogen lamp (col. 4, lines 38-39). Monroe et al does not suggest the illumination source comprises at least one light emitting diode as claimed. Ooshima et al makes it well known the use of LED as illumination source in a video scope system suitable for dental application (col. 4, lines 19-53).

Therefore, taking the combined teaching of Monroe et al and Ooshima et al as a whole, it would have been obvious to replace the miniature halogen lamp 84 in Monroe et al (fig. 2) with that of an LED as the illumination source as taught in Ooshima et al for the benefit of lower power consumption and longer serving life (Ooshim et al, col. 4, lines 33-36).

Re claim 39, the camera handpiece of claim 36 wherein said illumination source comprises at least one light emitting diode. (The limitations have been analyzed and rejected w/r to claim 13).

8. Claims 23-24, 48, 55, 60, 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Monroe et al as applied claims 1, 22, 29, 47, 56, 64 above and further in view of Williams et al, US 5,124,797.

Re claim 23, Monroe et al discloses the dental imaging system of claims 1 and 22 that includes focus position adjustments, but fails to disclose "...wherein each of said plurality of predetermined focus modes is selected by adjusting a ring in said handle region of said handpiece, said ring being operatively connected to an assembly for axial adjusting said sensor assembly such that an adjustment in said ring results in said assembly axially adjusting said sensor assembly to correspond to a predetermined focus mode" as claimed.

Williams et al makes it well known adjusting focus positions by adjusting a ring in a handle region of a handpiece of a dental probe (fig. 1, col. 3, lines 34-43).

Therefore, taking the combined teaching of Monroe et al and Williams et al as a whole, it would have been obvious to modify Monroe et al to include a ring disposed at the handle region of a handpiece of a dental probe for the purpose of adjusting focus positions, thus permitting focus adjustment without interference (Williams et al, col. 3, lines 34-37).

Re claim 24, the dental imaging system of claim 1 wherein a plurality of predetermined focus modes are selected by adjusting a ring in said handle region of

Art Unit: 2613

said handpiece, said ring being operatively connected to an assembly for axial adjusting at least one element of said optical system relative to said sensor assembly such that an adjustment in said ring results in said assembly axially adjusting said at least one element of said optical system to correspond to a predetermined focus mode. (The limitations have been analyzed and rejected w/r to claim 23 above).

Re claim 48, the camera handpiece of claim 47 wherein each of said plurality of predetermined focus modes is selected by adjusting a ring in said handle region of said housing, said ring being operatively connected to an assembly for axial adjusting said sensor assembly such that an adjustment in said ring results in said assembly axially adjusting said sensor assembly to correspond to a predetermined focus mode. (The limitations have been analyzed and rejected w/r to claim 23 above).

Re claim 55, the camera handpiece of claim 29 wherein a plurality of predetermined focus modes are selected by adjusting a ring in said handle region of said housing, said ring being operatively connected to an assembly for axial adjusting at least one element of said optical system relative to said sensor assembly such that an adjustment in said ring results in said assembly axially adjusting said at least one element of said optical system to correspond to a predetermined focus mode. (The limitations have been analyzed and rejected w/r to claim 23 above).

Re claim 60, the dental imaging system of claim 56 wherein said sensor assembly is axially adjustable into a plurality of predetermined focus modes to focus on said dental anatomy and each of said plurality of predetermined focus modes is

selected by adjusting a ring in said handle region in said handpiece. (The limitations have been analyzed and rejected w/r to claim 23 above).

Re claim 67, the camera handpiece of claim 64 wherein said sensor assembly is axially adjustable into a plurality of predetermined focus modes to focus on said dental anatomy and each of said plurality of predetermined focus modes is selected by adjusting a ring in said handle region in said handpiece. (The limitations have been analyzed and rejected w/r to claim 23 above).

9. Claims 26-28, 50-53, 63, 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Monroe et al as applied claims 1-2, 29, 56, 64 above and further in view of Cooper, US 5,702,249.

Re claim 26, Monroe et al discloses the dental imaging system of claims 1-2 comprising an optical system (figs. 1-2) having a window 24 to acquire an image of a dental anatomy, but fails to disclose "...a prism to reflect said image of said dental anatomy acquired from said window; and a lens assembly to transmit said image of said dental anatomy received from said prism to said sensor assembly" as claimed.

Cooper makes it well known a dental imaging system (fig. 3) that includes a prism (16, col. 7, lines 40-52) that reflects an acquired image to a lens assemblies (17, 18).

Therefore, taking the combined teaching of Monroe et al and Cooper as a whole, it would have been obvious to modify the lens assembly of Monroe to include a prism in conjunction with lens assemblies as taught by Cooper for the benefit of projecting

Art Unit: 2613

images without rotating the images themselves i.e. "the mirror image effect" (Cooper, col. 7, lines 53-63)

Re claim 27, the dental imaging system of claim 26 wherein said optical system further comprises a negative lens (See Cooper, col. 6, line 47).

Re claim 28, the dental imaging system of claim 26 wherein said prism is a non-inverting prism (See Cooper, col. 7, lines 53-63).

Re claim 50, the camera handpiece of claim 29 wherein said optical system comprises: a window to acquire said image of said dental anatomy; a prism to reflect said image of said dental anatomy acquired from said window; and a lens assembly to transmit said image of said dental anatomy received from said prism to said sensor assembly. (The limitations have been analyzed and rejected w/r to claim 26).

Re claim 51, the camera handpiece of claim 50 wherein said optical system further comprises a negative lens. (The limitations have been analyzed and rejected w/r to claim 27).

Re claim 52, the camera handpiece of claim 50 wherein said prism is a non-inverting prism. (The limitations have been analyzed and rejected w/r to claim 28).

Re claim 53, the camera handpiece of claim 50 wherein: said prism is an inverting prism (Cooper, col. 7, lines 55-56);

and said camera control unit comprises orienting circuitry to orient said image received from said sensor assembly (Cooper, col. 7, lines 53-63).

Re claim 63, the dental imaging system of claim 56 wherein said optical system comprises: a window to acquire said image of said dental anatomy; a negative lens to

Art Unit: 2613

pass a narrow angle image of said acquired image; a non-inverting prism to reflect said narrow angle image of said dental anatomy passed by said negative lens; and a lens assembly to transmit said narrow angle image of said dental anatomy received from said prism to said sensor assembly. (The limitations have been analyzed and rejected w/r to claims 26-28).

Re claim 70, the camera handpiece of claim 64 wherein said optical system comprises: a window to acquire said image of said dental anatomy; a negative lens to pass a narrow angle image of said acquired image; a non-inverting prism to reflect said narrow angle image of said dental anatomy passed by said negative lens; and a lens assembly to transmit said narrow angle image of said dental anatomy received from said prism to said sensor assembly. (The limitations have been analyzed and rejected w/r to claims 26-28).

Claim Objections

10. Claim 15 is objected to because of the following informalities:

In line 2 and 4, "said said" is recited, please delete one. Appropriate correction is required.

Allowable Subject Matter

11. Claims 17-18, 25, 42-43, 49, 61, 68 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

Claims 17 and 42 recite the dental imaging system wherein said flexible printed circuit to interconnect said camera control unit with said sensor assembly is positioned in an elongated loop to permit axial adjustment of said sensor assembly for focusing on said dental anatomy. The prior art of record fails to anticipate or render obvious the underlined limitations.

Claims 18 and 43 recite the dental imaging system wherein said connector to flexibly interconnect said camera control unit with said sensor assembly comprises an extension board rigidly connected to said camera control unit and said sensor assembly such that said camera control unit and said sensor assembly are axially adjustable in tandem for focusing said sensor assembly upon said dental anatomy. The prior art of record fails to anticipate or render obvious the underlined limitations.

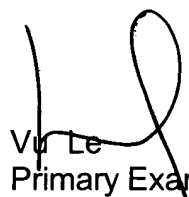
Claims 25, 49, 61 and 68 recite the dental imaging system wherein said handpiece comprises a conical section between said handle portion and said distal end portion, said conical section having plurality of orientation dimples spaced circumferentially about said conical section, wherein holding said conical section of said housing with an index finger positioned in an orientation dimple orients said view port in a pre-selected viewing direction. The prior art of record fails to anticipate or render obvious the underlined limitations.

Contact

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vu Le whose telephone number is 703-308-6613. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Kelley can be reached on 703-305-4856. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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